Bull Trout Final Critical Habitat Justification: Rationale for Why Habitat is Essential, and Documentation of Occupancy

Chapter 9. Klamath Recovery Unit—Klamath River Basin Critical Habitat Unit

Chapter 9. Klamath River Basin Critical Habitat Unit

Please refer to the RU section above that describes why the Klamath River Basin CHU is essential and see Appendix 1 for more detailed information.

The Klamath River Basin CHU is located in south-central Oregon and includes three CHSUs: (1) Upper Klamath Lake CHSU; (2) Sycan River CHSU; and (3) Upper Sprague River CHSU. Total designated critical habitat in this unit includes 445.2 km (276.6 mi) of streams and 3,775.5 ha (9,329.5 ac) of lake surface area.

9.1. Upper Klamath Lake Critical Habitat Subunit

This CHSU is essential to bull trout conservation because it is needed to maintain redundancy in local population numbers. Only two populations (Sun Creek and Threemile Creek) remain in this CHSU out of seven local populations in all three CHSUs combined, placing the Upper Klamath Lake CHSU populations at an increased risk of extirpation. These local populations likely face greater risk because they are not interconnected. Extirpation of local populations in the Upper Klamath Lake CHSU has occurred in recent times. Populations in this CHSU are genetically differentiated from those in the other two CHSUs in the Klamath River Basin CHU. Among all three CHSUs in the Klamath RU, genetic variation is lowest in this CHSU. The two local populations have been isolated from habitat fragmentation and have experienced population bottlenecks. As such, currently unoccupied habitat is needed to restore connectivity among local populations and is designated as critical habitat. This unoccupied critical habitat includes canals, which now provide the only means of connectivity as migratory corridors.

The Service has designated West and Sevenmile Canals as critical habitat because they will provide connectivity between recovered local populations. West Canal intercepts the flows from Cherry, Threemile, Crane, and Fourmile Creeks and provides a corridor of connectivity between these streams. Before the creation of West Canal, these streams likely connected directly with FMO habitat in the Upper Klamath and Agency Lakes. Sevenmile Canal is the redirected, channelized lower reaches of Sevenmile Creek and also provides a connectivity corridor between streams supporting isolated local populations of bull trout. Therefore, these canals, although artificial, now represent aquatic habitat important to bull trout recovery.

Because isolation and habitat fragmentation resulting from migratory barriers have negatively affected bull trout by (1) reducing geographical distribution; (2) increasing the probability of losing individual local populations; (3) increasing the probability of hybridization with introduced brook trout; (4) reducing the potential for movements in response to developmental, foraging, and seasonal habitat requirements; and (5) reducing reproductive capability by eliminating the larger, more fecund migratory form from many subpopulations, restoring connectivity and the frequency of occurrence of the migratory form will be an important factor in providing for bull trout recovery (see Appendix 1 for more detailed information).

The Upper Klamath Lake CHSU is comprised of Upper Klamath Lake, Agency Lake, and their immediate major and minor tributaries within Klamath County. Designated critical habitat includes 163.1 km (101.4 mi) of stream in 15 reaches and 3775.5 ha (9329.5 ac) of lake in the Upper Klamath Lake CHSU.

The following water bodies are included in this CHSU (also see Table 32):

(A) The entire 3,775.5 ha (9,329.5 ac) of Agency Lake is unoccupied but is expected to provide FMO habitat that is considered essential to the conservation of bull trout.

(B) Sun Creek from Sun Falls downstream 9.6 km (5.9 mi) to the lower limit of bull trout distribution provides spawning and rearing habitat for a local population. An unoccupied reach of Sun Creek below bull trout distribution downstream 9.3 km (5.8 mi) to its confluence is expected to provide essential spawning and rearing habitat.

(C) An unoccupied reach of Annie Creek from its confluence with the Wood River upstream 17.5 km (10.9 mi) to Annie Falls is expected to provide essential spawning and rearing habitat.

(D) An unoccupied reach of Sevenmile Creek from its confluence with Sevenmile Canal upstream 11.8 km (7.3 mi) is expected to provide FMO habitat. An unoccupied reach of Sevenmile Creek from the upper limit of FMO habitat upstream 8.7 km (5.4 mi) to Sevenmile Marsh is expected to provide spawning and rearing habitat.

(E) An unoccupied reach of Threemile Creek from its confluence with Crane Creek upstream 6.0 km (3.8 mi) to the lower limit of bull trout distribution is expected to provide spawning and rearing habitat; and the lower limit of bull trout distribution upstream 2.5 km (1.6 mi) to the upper limit of permanent water provides spawning and rearing habitat.

(F) An unoccupied reach of Crane Creek from its confluence with Threemile Creek upstream 1.8 km (1.1 mi) to its confluence with West Canal is expected to provide FMO habitat.

(G) An unoccupied reach of Fourmile Creek from its origin downstream 3.8 km (2.4 mi) to its confluence with West Canal is expected to provide FMO habitat.

(H) An unoccupied reach of Cherry Creek from its confluence with Fourmile Creek upstream 14.8 km (9.2 mi) to the upper limit of permanent water is expected to provide spawning and rearing habitat.

(I) An unoccupied reach of Sevenmile Canal from its confluence with Agency Lake upstream 9.9 km (6.1 mi) to its confluence with West Canal and Sevenmile Creek is expected to provide FMO habitat.

(J) An unoccupied reach of West Canal from its confluence with Agency Lake upstream 16.7 km (10.4 mi) to its confluence with Sevenmile Canal is expected to provide FMO habitat.

(K) An unoccupied reach of the Wood River from its confluence with Agency Lake upstream 31.2 km (19.4 mi) to its source springs is expected to provide FMO habitat.

(L) An unoccupied reach of Crooked Creek from its confluence with the Wood River upstream 14.5 km (9.0 mi) to its source is expected to provide spawning and rearing habitat.

(M) An unoccupied reach of Fort Creek from its confluence with the Wood River upstream 5.0 km (3.1 mi) to its source is expected to provide spawning and rearing habitat.

Table 32. Water body segments designated as critical habitat for bull trout, including documentation of occupancy and site-specific rationale in the Klamath River Basin–Upper Klamath Lake CHU/CHSU

CHU—CHSU	Water Body Name	State	Information Documenting Bull Trout Occupancy	Essential Habitat Rationale	LLID
Klamath River Basin–Upper Klamath Lake	Annie Creek	OR	Bull trout were historically present in Annie Creek (D. Hering, CLNP pers. comm. 2009)	This unoccupied reach of Annie Creek is expected to provide SR habitat. Annie Creek has been identified as a potential stream for reestablishment efforts as described in the draft recovery plan (Service 2002a, ch. 2).	1219896 427215.1
Klamath River Basin–Upper Klamath Lake	Annie Creek	OR	Bull trout were historically present in Annie Creek (D. Hering, CLNP, pers. comm. 2009)	This unoccupied reach of Annie Creek is expected to provide SR habitat. Annie Creek has been identified as a potential stream for reestablishment efforts as described in the draft recovery plan (Service 2002a, ch. 2).	1219896 427215.2
Klamath River Basin–Upper Klamath Lake	Cherry Creek	OR	Bull trout were historically present in Cherry Creek, but are now believed to be extirpated (Service 2002a, p. 10).	This unoccupied reach of Cherry Creek is expected to provide SR habitat. Cherry Creek has been identified as a potential stream for reestablishment efforts as described in the draft recovery plan (Service 2002a, ch. 2).	1220692 426275
Klamath River Basin–Upper Klamath Lake	Crane Creek	OR	Bull trout have not been documented from this creek though they may have historically used it. This creek provides a connectivity corridor between streams, supporting isolated local populations of bull trout.	This unoccupied reach of Crane Creek is expected to provide FMO habitat and is important for resurrecting migratory forms of bull trout in the Upper Klamath Lake core area and re-establishing connectivity between recovered populations of bull trout in Cherry, Threemile, and Sevenmile Creeks.	1220515 426375
Klamath River Basin–Upper Klamath Lake	Crooked Creek	OR	Bull trout have not been documented from this creek though they may have used it historically. This is a tributary to the Wood River, which was formerly occupied (Dambacher et al. 1992, p. 30).	An unoccupied reach of Crooked Creek is expected to provide SR habitat. Crooked Creek has been identified as a potential stream for reestablishment efforts as described in the draft recovery plan (Service 2002a, ch. 2).	1219457 425985
Klamath River Basin–Upper Klamath Lake	Fort Creek	OR	Bull trout were historically present in Fort Creek (Cavendar 1978; Buchanan et al. 1997, p. 26; C. Bienz, pers. comm. 2009), but are now extirpated.	This unoccupied reach of Fort Creek is expected to provide SR habitat. Fort Creek has been identified as a potential stream for reestablishment efforts as described in the draft recovery plan (Service 2002a, ch. 2).	1219797 426720
Klamath River Basin–Upper Klamath Lake	Fourmile Creek	OR	Bull trout have not been documented from this creek though they may have used it historically. This creek provides a connectivity corridor between streams supporting isolated local populations of bull trout.	This unoccupied reach of Fourmile Creek is expected to provide FMO habitat. Fourmile Creek has been identified as a potential stream for reestablishment efforts as described in the draft recovery plan (Service 2002a, ch. 2).	1219837 425320.1
Klamath River Basin–Upper Klamath Lake	Fourmile Creek	OR	Bull trout have not been documented from this creek though they may have used it historically. This creek provides a connectivity corridor between streams supporting isolated local populations of bull trout.	This unoccupied reach of Fourmile Creek is expected to provide FMO habitat. Fourmile Creek has been identified as a potential stream for reestablishment efforts as described in the draft recovery plan (Service 2002a, ch. 2).	1219837 425320.2

CHU—CHSU	Water Body Name	State	Information Documenting Bull Trout Occupancy	Essential Habitat Rationale	LLID
Klamath River Basin–Upper Klamath Lake	Sevenmile Canal	OR	Bull trout were historically present in Sevenmile Creek, but are now believed to be extirpated (Cope 1879; Service 2002a, ch. 2).	This unoccupied reach of Sevenmile Canal is expected to provide FMO habitat.	1219525 425737
Klamath River Basin–Upper Klamath Lake	Sevenmile Creek	OR	Bull trout were historically present in Sevenmile Creek, but are now believed to be extirpated (Cope 1879; Service 2002a, ch. 2).	This unoccupied reach of Sevenmile Creek is expected to provide FMO habitat. Sevenmile Creek has been identified as a potential stream for reestablishment efforts as described in the draft recovery plan (Service 2002a, ch. 2).	1220516 426463.1
Klamath River Basin–Upper Klamath Lake	Sevenmile Creek	OR	Bull trout were historically present in Sevenmile Creek, but are now believed to be extirpated (Cope 1879; Service 2002a, ch. 2).	This unoccupied reach of Sevenmile Creek is expected to provide SR habitat. Sevenmile Creek has been identified as a potential stream for reestablishment efforts as described in the draft recovery plan (Service 2002a, ch. 2).	1220516 426463.2
Klamath River Basin–Upper Klamath Lake	Sun Creek	OR	This unoccupied portion of Sun Creek was likely occupied by bull trout (Dambacher et al. 1992).	This unoccupied reach of Sun Creek is expected to provide SR habitat. This portion of Sun Creek has been identified for restoration as described in the draft recovery plan (Service 2002a, ch. 2).	1220087 427344.2
Klamath River Basin–Upper Klamath Lake	Sun Creek	OR	Most recent confirmed presence of bull trout in 2008 documented by the Crater Lake National Park, (Hering and Buktenica 2008) and from 2009 snorkel surveys (D. Hering, pers. comm.2009).	Sun Creek is essential as it currently provides SR habitat for this local population of bull trout.	1220087 427344.1
Klamath River Basin–Upper Klamath Lake	Threemile Creek	OR	Most recently confirmed presence of bull trout documented by electrofishing in 2009 (R. Smith, ODFW, pers. comm.), and snorkel surveys in 2009 (N. Banish, personal observation).	This tributary in the Upper Klamath Lake CHSU is essential because it is currently occupied by bull trout and provides SR habitat for the resident local population.	1220659 426418.1
Klamath River Basin–Upper Klamath Lake	Threemile Creek	OR	This unoccupied portion of Threemile Creek was likely occupied by bull trout (Buchanan et al. 1997).	This unoccupied reach of Threemile Creek is expected to provide SR habitat. This portion of Threemile Creek has been identified for restoration as described in the draft recovery plan (Service 2002a, ch. 2).	1220659 426418.2
Klamath River Basin–Upper Klamath Lake	Threemile Creek	OR	This unoccupied portion of Threemile Creek was likely occupied by bull trout (Buchanan et al. 1997).	This unoccupied reach of Threemile Creek is expected to provide SR habitat. This portion of Threemile Creek has been identified for restoration as described in the draft recovery plan (Service 2002a, ch. 2).	1220659 426418.3
Klamath River Basin–Upper Klamath Lake	West Canal	OR	Bull trout are currently (or were historically) present in tributary streams that empty into West Canal (i.e., Threemile and Cherry creeks; (Service 2002a, ch. 2)). West Canal intercepts the flows from Threemile, Cherry, Crane, and Fourmile creeks and provides a corridor of connectivity between these streams.	This unoccupied reach of West Canal is expected to provide FMO habitat.	1220504 426465

CHU—CHSU	Water Body Name	State	Information Documenting Bull Trout Occupancy	Essential Habitat Rationale	LLID
Klamath River Basin–Upper Klamath Lake	Wood River	OR	The Wood River was historically occupied by bull trout (Dambacher et al. 1992; Buchanan et al. 1997), but is now believed to be extirpated.	This unoccupied reach of the Wood River is expected to provide FMO habitat. This portion of the Wood River has been identified for restoration as described in the draft recovery plan (Service 2002a, ch. 2).	1219445 425983
Klamath River Basin–Upper Klamath Lake	Agency Lake	OR	Bull trout have not been documented from Agency Lake though they may have used it historically (OCAFS 1993). This lake would provide a connectivity corridor between local populations of bull trout and a productive foraging area. For instance, Agency Lake supports adfluvial redband trout (NRC 2004) that are able to grow quite large (640mm; Behnke 1992), evidently based on the abundant forage base.	Agency Lake is unoccupied but is expected to provide FMO habitat. Agency Lake is critically important for restoring migratory forms of bull trout in the Upper Klamath Lake CHSU, and reestablishing connectivity between recovered local populations of bull trout.	1219641 425408

9.2. Sycan River Critical Habitat Subunit

This CHSU is essential to bull trout conservation because it is needed to maintain redundancy in local population numbers. Only one local population (Long Creek) remains in this CHSU out of seven local populations in all three CHSUs combined, placing the Sycan River CHSU population at an increased risk of extirpation. The local population in this CHSU likely faces greater risk because it is the only remaining local population. Other local populations in the Sycan River CHSU have been extirpated. This CHSU's local population is genetically differentiated from those in the other two CHSUs. This CHSU also is essential in that bull trout in this CHSU exhibit resident and fluvial life histories, which are important for representing diverse life history expression in the Klamath RU. Migratory bull trout are able to grow larger than their resident counterparts, resulting in greater fecundity and higher reproduction potential. Migratory life history forms also have been shown to be important for population persistence and resilience (see Appendix 1 for more detailed information).

The Sycan River CHSU comprises the Sycan Marsh and its tributaries and the Sycan River and its tributaries in Klamath and Lake Counties. Designated critical habitat includes 138.9 km (86.3 mi) of stream in 10 reaches in the Sycan River CHSU. The following water bodies are included in this CHSU (see Table 33):

(A) Long Creek from its confluence with the Sycan River upstream 36.7 km (22.8 mi) provides FMO habitat; Long Creek from the upper limit of FMO habitat upstream 4.4 km (2.7 mi) to its source provides spawning and rearing habitat.

(B) An unnamed tributary to Long Creek from its confluence with Long Creek upstream 0.5 km (0.3 mi) to a natural barrier provides spawning and rearing habitat.

(C) An unoccupied reach of Calahan Creek from its confluence with Long Creek upstream 11.3 km (7.0 mi) to its source is expected to provide spawning and rearing habitat.

(D) An unoccupied reach of Coyote Creek from its terminus within Sycan Marsh upstream 15.4 km (9.6 mi) to the upper limit of permanent water is expected provide spawning and rearing habitat.

(E) An unoccupied reach of the Sycan River from its confluence with Long Creek upstream 48.3 km (30 mi) to its confluence with Rock Creek is expected provide FMO habitat and from the upper limit of possible FMO habitat upstream 11.7 km (7.3 mi) to its origin is expected to provide spawning and rearing habitat.

(F) An unoccupied reach of the South Fork Sycan River from its confluence with the Sycan River upstream 4.1 km (2.6 mi) to its origin is expected to provide spawning and rearing habitat.

(G) An unoccupied reach of Rifle Creek from its confluence with the Sycan River upstream 4.0 km (2.5 mi) to its origin is expected to provide spawning and rearing habitat.

(H) An unoccupied reach of Boulder Creek from its confluence with the Sycan River upstream 2.5 km (1.5 mi) to its headwaters is expected to provide spawning and rearing habitat.

Table 33. Water body segments designated as critical habitat for bull trout, including documentation of occupancy and site-specific rationale in the Klamath River Basin–Sycan River CHU/CHSU

CHU—CHSU	Water Body Name	State	Information Documenting Bull Trout Occupancy	Essential Habitat Rationale	LLID
Klamath River Basin–Sycan River	Boulder Creek	OR	Bull trout have not been documented from this creek, though they may have used it historically. This is a tributary to the Sycan River, which was formerly occupied (Light et al. 1996).	This unoccupied reach is expected to provide SR habitat for an additional local population. Boulder Creek has been identified as a potential stream for reestablishment efforts as described in the draft recovery plan (Service 2002a, ch. 2).	1207843 426598
Klamath River Basin–Sycan River	Calahan Creek	OR	Bull trout are believed to be extirpated from Calahan Creek (Service 2002a, ch. 2). The last documentation of bull trout was from 1993 (Light et al. 1996).	Calahan Creek is expected to provide SR habitat. Calahan Creek has been identified as a potential stream for reestablishment efforts as described in the draft recovery plan (Service 2002a, ch. 2).	1212668 428377
Klamath River Basin–Sycan River	Coyote Creek	OR	Bull trout were historically present in Coyote Creek (Light et al. 1996; Service 2002a, ch. 2), but are now believed to be extirpated.	This unoccupied reach of Coyote Creek is expected to provide SR habitat. Coyote Creek has been identified as a potential stream for reestablishment efforts as described in the draft recovery plan (Service 2002a, ch. 2).	1211088 428621.1
Klamath River Basin–Sycan River	Long Creek	OR	Most recent confirmed presence of bull trout in 2008 documented by U.S. Forest Service (USFS in litt. 2009g, p. 2), and from a 2009 snorkel event (M. Raade, pers. comm. 2009; L. Schultz, pers. comm.2009). Currently occupied by fluvial bull trout (C. Bienz, pers. comm. 2009).	This tributary to the Sycan River is essential because it is currently occupied by bull trout, and provides FMO habitat for the resident local population.	1211600 427263.1
Klamath River Basin–Sycan River	Long Creek	OR	Most recent confirmed presence of bull trout in 2008 documented by U.S. Forest Service (USFS in litt. 2009g, p. 2), and from a 2009 snorkel event (M. Raade, pers. comm. 2009; L. Schultz, pers. comm.2009).	This tributary to the Sycan River is essential because it is currently occupied by bull trout, and provides SR habitat for the resident local population.	1211600 427263.2
Klamath River Basin–Sycan River	Long Creek	OR	Most recent confirmed presence of bull trout in 2008 documented by U.S. Forest Service (USFS in litt. 2009g, p. 2), and from a 2009 snorkel event (M. Raade, pers. comm. 2009; L. Schultz, pers. comm. 2009). Currently occupied by fluvial bull trout (C. Bienz, pers. comm. 2009).	This tributary to the Sycan River is essential because it is currently occupied by bull trout, and provides FMO habitat for the resident local population.	1211600 427263.3
Klamath River Basin–Sycan River	Long Creek	OR	Most recent confirmed presence of bull trout in 2008 documented by U.S. Forest Service (USFS in litt. 2009g), and from a 2009 snorkel event (M. Raade, pers. comm. 2009; L. Schultz, pers. comm.2009). Currently occupied by fluvial bull trout (C. Bienz, pers. comm. 2009).	This tributary to the Sycan River is essential because it is currently occupied by bull trout, and provides FMO habitat for the resident local population.	1211600 427263.4

CHU—CHSU	Water Body Name	State	Information Documenting Bull Trout Occupancy	Essential Habitat Rationale	LLID
Klamath River Basin–Sycan River	Long Creek	OR	Most recent confirmed presence of bull trout in 2008 documented by U.S. Forest Service (USFS in litt. 2009g), and from a 2009 snorkel event (M. Raade, pers. comm. 2009; L. Schultz, pers. comm. 2009). Currently occupied by fluvial bull trout (C. Bienz, pers. comm. 2009).	This tributary to the Sycan River is essential because it is currently occupied by bull trout, and provides FMO habitat for the resident local population.	1211600 427263.5
Klamath River Basin–Sycan River	Long Creek	OR	Bull trout have not been documented from this reach of Long creek, though they may have used it historically. This is a tributary to the Sycan River, portions of which were previously occupied by bull trout (ODFW 1968; Light et al. 1996, p.30; Buchanan et al. 1997, p. 29).	This unoccupied reach of Long Creek is essential because it is expected to provide FMO habitat for the resident local population.	1211600 427263.6
Klamath River Basin–Sycan River	Coyote Creek	OR	Bull trout were historically present in Coyote Creek (Light et al. 1996, p. 31; Service 2002a, p. 13), but are now believed to be extirpated.	This unoccupied reach of Coyote Creek is expected to provide SR habitat. Coyote Creek has been identified as a potential stream for reestablishment efforts as described in the draft recovery plan (Service 2002a, ch. 2).	1211088 428621.2
Klamath River Basin–Sycan River	Rifle Creek	OR	Bull trout have not been documented from this creek, though they may have used it historically. This is a tributary to the Sycan River, which was formerly occupied (Light et al. 1996, p. 30).	This unoccupied reach is expected to provide SR habitat for an additional local population. Rifle Creek has been identified as a potential stream for reestablishment efforts as described in the draft recovery plan (Service 2002a, ch. 2).	1208809 426935
Klamath River Basin–Sycan River	South Fork Sycan River	OR	The Sycan River was historically occupied by bull trout (ODFW 1968; Light et al. 1996, p. 30; Buchanan et al. 1997, p. 29).	This unoccupied reach of the South Fork Sycan River is expected to provide SR habitat. The SF Sycan River has been identified as a potential stream for reestablishment efforts as described in the draft recovery plan (Service 2002a, ch. 2).	1207944 426631
Klamath River Basin–Sycan River	Sycan River	OR	The Sycan River was historically occupied by bull trout (ODFW 1968; Light et al. 1996, p. 30; Buchanan et al. 1997, p. 29).	This unoccupied reach of the Sycan River is expected to provide FMO habitat. The Sycan River has been identified as a potential stream for reestablishment efforts as described in the draft recovery plan (Service 2002a, ch. 2).	1212872 424605.1
Klamath River Basin–Sycan River	Sycan River	OR	The Sycan River was historically occupied by bull trout (ODFW 1968; Light et al. 1996, p. 30; Buchanan et al. 1997, p. 29).	This unoccupied reach of the Sycan River is expected to provide SR habitat. The Sycan River has been identified as a potential stream for reestablishment efforts as described in the draft recovery plan (Service 2002a, ch. 2).	1212872 424605.2
Klamath River Basin–Sycan River	Sycan River	OR	The Sycan River was historically occupied by bull trout (ODFW 1968; Light et al. 1996, p. 30; Buchanan et al. 1997, p. 29).	This unoccupied reach of the Sycan River is expected to provide FMO habitat. The Sycan River has been identified as a potential stream for reestablishment efforts as described in the draft recovery plan (Service 2002a, ch. 2).	1212872 424605.3

CHU—CHSU	Water Body Name	State	Information Documenting Bull Trout Occupancy	Essential Habitat Rationale	LLID
Klamath River Basin–Sycan River	Sycan River	OR	The Sycan River was historically occupied by bull trout (ODFW 1968; Light et al. 1996, p. 30; Buchanan et al. 1997, p. 29).	This unoccupied reach of the Sycan River is expected to provide FMO habitat. The Sycan River has been identified as a potential stream for reestablishment efforts as described in the draft recovery plan (Service 2002a, ch. 2).	1212872 424605.4
Klamath River Basin–Sycan River	Unnamed Tributary of Long Creek	OR	Most recent confirmed presence of bull trout documented by ODFW in 2005 (B. Tinniswood, ODFW, pers. comm.).	This tributary to Long Creek is essential because it is currently occupied by bull trout, and provides SR habitat for the resident local population.	1213194 429185

9.3. Upper Sprague River Critical Habitat Subunit

This CHSU is essential to bull trout conservation because it is needed to maintain redundancy in local population numbers. Five local populations (Boulder Creek, Dixon Creek, Deming Creek, Leonard Creek, and Brownsworth Creek) remain in this CHSU out of seven local populations in all three CHSUs combined, placing the Upper Sprague River CHSU at an intermediate risk of extinction. These local populations likely face a higher risk because not all are interconnected. Populations in this CHSU are genetically differentiated from those in the other two CHSUs. This CHSU also is essential in that bull trout in this CHSU exhibit resident and fluvial life histories, which are important for representing diverse life history expression in the Klamath RU. Migratory bull trout are able to grow larger than their resident counterparts, resulting in greater fecundity and higher reproduction potential. Migratory life history forms also have been shown to be important for population persistence and resilience (see Appendix 1 for more detailed information).

The Upper Sprague River CHSU comprises the drainages of the North Fork Sprague River and South Fork Sprague River and their tributaries in Klamath and Lake Counties. Designated critical habitat includes 145.1 km (90.1 mi) of stream in 18 reaches in the Upper Sprague River CHSU. The following water bodies are included in this CHSU (see Table 34):

(A) The North Fork Sprague River from Forest Road 3411 upstream 5.6 km (3.5 mi) to Boulder Creek provides FMO habitat; an unoccupied reach of the North Fork Sprague River from its confluence with Boulder Creek upstream 29.8 km (18.6 mi) to the limit of permanent water is expected to provide additional FMO habitat.

(B) An unoccupied reach of Gearhart Creek from its confluence with the North Fork Sprague River upstream 9.0 km (5.6 mi) to Gearhart Marsh is expected to provide spawning and rearing habitat.

(C) An unoccupied reach of Hole Creek from its confluence with Gearhart Creek upstream 3.3 km (2.0 mi) to the upper limit of permanent water is expected to provide spawning and rearing habitat.

(D) An unoccupied reach of Nottin Creek from its confluence with Gearhart Creek upstream 5.3 km (3.3 mi) to the upper limit of permanent water is expected to provide spawning and rearing habitat.

(E) An unoccupied reach of School Creek from its confluence with the North Fork Sprague River upstream 7.0 km (4.3 mi) to its origin is expected to provide spawning and rearing habitat.

(F) An unoccupied reach of Dead Cow Creek from its confluence with the North Fork Sprague River upstream 6.6 km (4.1 mi) is expected to provide spawning and rearing habitat.

(G) An unoccupied reach of Gold Creek from its confluence with Dead Cow Creek upstream 2.9 km (1.8 km) is expected to provide spawning and rearing habitat.

(H) Boulder Creek from its confluence with the North Fork Sprague River upstream 7.7 km (4.8 mi) to its origin provides spawning and rearing habitat.

(I) Dixon Creek from its confluence with Boulder Creek upstream 2.2 km (1.4 mi) to its origin provides spawning and rearing habitat.

(J) An unnamed tributary to Dixon Creek from its confluence with Dixon Creek upstream 0.9 km (0.5 mi) to its origin provides spawning and rearing habitat.

(K) Deming Creek from its confluence with Anderson Field upstream 7.8 km (4.8 mi) to its headwaters provides spawning and rearing habitat.

(L) Brownsworth Creek from its confluence with the South Fork Sprague River upstream 13.4 km (8.3 mi) to the upper limit of permanent water provides spawning and rearing habitat.

(M) Leonard Creek from its confluence with Brownsworth Creek upstream 6.8 km (4.2 mi) to its source provides spawning and rearing habitat.

(N) An unoccupied reach of the South Fork Sprague River from its confluence with Brownsworth Creek upstream 21.7 km (13.5 mi) to its confluence with Camp Creek is expected to provide FMO habitat. An unoccupied reach of the South Fork Sprague River from its confluence with Camp Creek upstream 5.6 km (3.5 mi) to its origin is expected to provide spawning and rearing habitat.

(O) An unoccupied reach of Camp Creek from its confluence with the South Fork Sprague River upstream 5.0 km (3.1 mi) to its origin is expected to provide spawning and rearing habitat.

(P) An unoccupied reach of Corral Creek from its confluence with the South Fork Sprague River upstream 4.5 km (2.8 mi) to its origin is expected to provide spawning and rearing habitat.

Table 34. Water body segments designated as critical habitat for bull trout, including documentation of occupancy and site-specific rationale in the Klamath River Basin–Upper Sprague River CHU/CHSU

CHU—CHSU	Water Body Name	State	Information Documenting Bull Trout Occupancy	Essential Habitat Rationale	LLID
Klamath River Basin–Upper Sprague River	Boulder Creek	OR	Most recently confirmed presence of bull trout documented by Hartill and Jacobs (2007, p. 4).	This tributary to the NF Sprague River is essential because it is currently occupied by bull trout, and provides SR habitat for the resident local population.	1209522 425167.1
Klamath River Basin–Upper Sprague River	Boulder Creek	OR	Most recently confirmed presence of bull trout documented by Hartill and Jacobs (2007, p. 4).	This tributary to the NF Sprague River is essential because it is currently occupied by bull trout, and provides SR habitat for the resident local population.	1209522 425167.2
Klamath River Basin–Upper Sprague River	Boulder Creek	OR	Presence of bull trout not confirmed from this reach, though it is presumed they use it at some time during the year.	This presumed reach of Boulder Creek is expected to provide FMO habitat as bull trout may use it during the winter or as a migratory corridor between the NF Sprague River and SR habitat in Boulder Creek.	1209522 425167.3
Klamath River Basin–Upper Sprague River	Brownsworth Creek	OR	Brownsworth Creek was sampled in 2007 to collect bull trout fin clips for a genetics study, and was the last electrofishing effort (Service in litt. 2008i, p. 4). Snorkel spot check surveys also have documented bull trout in 2009 (T. Smith, USFS, pers. comm.). This unoccupied reach is directly upstream of the occupied reach.	This tributary to the SF Sprague River is essential because it is currently occupied by bull trout, and provides SR habitat for the resident local population.	1209141 423918.1
Klamath River Basin–Upper Sprague River	Brownsworth Creek	OR	Bull trout were collected from Brownsworth Creek in 2007 to gather fin clips for a genetics study, and was the last electrofishing effort (Service in litt. 2008i, p. 4). Snorkel spot check surveys also have documented bull trout in 2009 (T. Smith, USFS, pers. comm.).	This tributary to the SF Sprague River is essential because it is upstream of currently occupied habitat for the resident local population.	1209141 423918.2
Klamath River Basin–Upper Sprague River	Camp Creek	OR	Bull trout have not been documented from this creek, though they may have used it historically. This is a tributary to the SF Sprague River, which likely was formerly occupied (Goetz 1989, p. 7; Buchanan et al. 1997, p. 29).	Camp Creek is expected to provide SR habitat. Camp Creek has been identified as a potential stream for reestablishment efforts as described in the draft recovery plan (Service 2002a, ch. 2).	1207947 424449
Klamath River Basin–Upper Sprague River	Corral Creek	OR	Bull trout have not been documented from this creek though they may have used it historically. This is a tributary to the SF Sprague River, which likely was formerly occupied (Goetz 1989, p. 7; Buchanan et al. 1997, p. 29).	Corral Creek is expected to provide SR habitat. Corral Creek has been identified as a potential stream for reestablishment efforts as described in the draft recovery plan (Service 2002a, ch. 2).	1207826 424549

CHU—CHSU	Water Body Name	State	Information Documenting Bull Trout Occupancy	Essential Habitat Rationale	LLID
Klamath River Basin–Upper Sprague River	Dead Cow Creek	OR	Bull trout have not been documented from this creek, though they may have used it historically. This is a tributary to the NF Sprague River, portions of which are occupied by bull trout (Service 2002a, p. 15), and was likely occupied to a larger extent historically (Buchanan et al. 1997, p. 29).	An unoccupied reach of Dead Cow Creek is expected to provide SR habitat. Dead Cow Creek has been identified as a potential stream for reestablishment efforts as described in the draft recovery plan (Service 2002a, ch. 2).	1208366 425898
Klamath River Basin–Upper Sprague River	Deming Creek	OR	Bull trout were last sampled in Deming Creek in 2005 (Moore 2006, p. 4). Deming Creek contains the largest abundance of bull trout in the Upper Sprague River CHSU.	This tributary to the SF Sprague River is essential because it is currently occupied by bull trout, and provides SR habitat for the resident local population.	1210743 424272.1
Klamath River Basin–Upper Sprague River	Deming Creek	OR	Bull trout were last sampled in Deming Creek in 2005 (Moore 2006, p. 4). Deming Creek contains the largest abundance of bull trout in the Upper Sprague River CHSU.	This tributary to the SF Sprague River is essential because it is upstream of currently occupied habitat for the resident local population.	1210743 424272.2
Klamath River Basin–Upper Sprague River	Dixon Creek	OR	Most recently confirmed presence of bull trout documented by Hartill and Jacobs (2007, p. 8).	This tributary to the NF Sprague River is essential because it is currently occupied by bull trout, and provides SR habitat for the resident local population.	1209383 425176.1
Klamath River Basin–Upper Sprague River	Dixon Creek	OR	Presence of bull trout not confirmed from this reach, though it is presumed they use it at some time during the year.	This presumed reach of Dixon Creek is expected to provide FMO habitat as bull trout may use it during the winter or as a migratory corridor between Boulder Creek and S/R habitat in Dixon Creek.	1209383 425176.2
Klamath River Basin–Upper Sprague River	Gearhart Creek	OR	Bull trout have not been documented from this creek though they may have used it historically. This is a tributary to the NF Sprague River, portions of which are occupied by bull trout (Service 2002a, p. 15), and was likely occupied to a larger extent historically (Buchanan et al. 1997, p. 29).	An unoccupied reach of Gearhart Creek is expected to provide SR habitat. Gearhart Creek has been identified as a potential stream for reestablishment efforts as described in the draft recovery plan (Service 2002a, ch. 2).	1208868 425658
Klamath River Basin–Upper Sprague River	Gold Creek	OR	Bull trout have not been documented from this creek, though they may have used it historically. This is a tributary to the NF Sprague River, portions of which are occupied by bull trout (Service 2002a, p. 15), and was likely occupied to a larger extent historically (Buchanan et al. 1997, p. 29).	An unoccupied reach of Gold Creek is expected to provide SR habitat. Gold Creek has been identified as a potential stream for reestablishment efforts as described in the draft recovery plan (Service 2002a, ch. 2).	1208194 425895

CHU—CHSU	Water Body Name	State	Information Documenting Bull Trout Occupancy	Essential Habitat Rationale	LLID
Klamath River Basin–Upper Sprague River	Hole Creek	OR	Bull trout have not been documented from this creek, though they may have used it historically. This is a tributary to the NF Sprague River, portions of which are occupied by bull trout (Service 2002a, p. 15), and was likely occupied to a larger extent historically (Buchanan et al. 1997, p. 29).	An unoccupied reach of Hole Creek is expected to provide SR habitat. Hole Creek has been identified as a potential stream for reestablishment efforts as described in the draft recovery plan (Service 2002a, ch. 2).	1208699 425673
Klamath River Basin–Upper Sprague River	Leonard Creek	OR	Most recently confirmed presence of bull trout documented by Hartill and Jacobs (2007, p. 11).	This tributary to the NF Sprague River is essential because it is currently occupied by bull trout, and provides SR habitat for the resident local population.	1208678 424133.1
Klamath River Basin–Upper Sprague River	Leonard Creek	OR	Most recently confirmed presence of bull trout documented by Hartill and Jacobs (2007, p. 11).	This tributary to the NF Sprague River is essential because it is currently occupied by bull trout, and provides SR habitat for the resident local population.	1208678 424133.2
Klamath River Basin–Upper Sprague River	Leonard Creek	OR	Presence of bull trout not confirmed from this reach, though it is presumed they use it at some time during the year.	This presumed reach of Leonard Creek is expected to provide FMO habitat as bull trout may use it during the winter, or as a migratory corridor between the SF Sprague River and S/R habitat in Leonard Creek.	1208678 424133.3
Klamath River Basin–Upper Sprague River	North Fork Sprague River	OR	A portion of the NF Sprague River is used as FMO habitat for fluvial fish (Service 2002a, p. 15). The NF Sprague River was likely occupied to a larger extent historically (Buchanan et al. 1997, p. 29).	The North Fork Sprague River is essential as it is expected to provide FMO habitat for fluvial bull trout.	1211099 424386.1
Klamath River Basin–Upper Sprague River	North Fork Sprague River	OR	A portion of the NF Sprague River is used as FMO habitat for fluvial fish (Service 2002a, p. 15). The NF Sprague River was likely occupied to a larger extent historically (Buchanan et al. 1997, p. 29).	The North Fork Sprague River is essential as it currently provides FMO habitat for fluvial bull trout.	1211099 424386.2
Klamath River Basin–Upper Sprague River	Nottin Creek	OR	Bull trout have not been documented from this creek, though they may have used it historically. This is a tributary to the NF Sprague River, portions of which are occupied by bull trout (Service 2002a, p. 15), and was likely occupied to a larger extent historically (Buchanan et al. 1997, p. 29).	An unoccupied reach of Nottin Creek is expected to provide SR habitat. Nottin Creek has been identified as a potential stream for reestablishment efforts as described in the draft recovery plan (Service 2002a, ch. 2).	1208711 425696
Klamath River Basin–Upper Sprague River	School Creek	OR	Bull trout have not been documented from this creek, though they may have used it historically. This is a tributary to the NF Sprague River, portions of which are occupied by bull trout (Service 2002a, p. 15), and was likely occupied to a larger extent historically (Buchanan et al. 1997, p. 29).	An unoccupied reach of School Creek is expected to provide SR habitat. School Creek has been identified as a potential stream for reestablishment efforts as described in the draft recovery plan (Service 2002a, ch. 2).	1208468 426039

CHU—CHSU	Water Body Name	State	Information Documenting Bull Trout Occupancy	Essential Habitat Rationale	LLID
Klamath River Basin–Upper Sprague River	South Fork Sprague River	OR	The SF Sprague River was likely formerly occupied (Goetz 1989, p. 7; Buchanan et al. 1997, p. 29).	This unoccupied reach of the South Fork Sprague River is expected to provide FMO habitat. The SF Sprague River has been identified as a potential stream for reestablishment efforts as described in the draft recovery plan (Service 2002a, ch. 2).	1211099 424385.1
Klamath River Basin–Upper Sprague River	South Fork Sprague River	OR	The SF Sprague River was likely formerly occupied (Goetz 1989, p. 7; Buchanan et al. 1997, p. 29).	This unoccupied reach of the South Fork Sprague River is expected to provide SR habitat. The SF Sprague River has been identified as a potential stream for reestablishment efforts as described in the draft recovery plan (Service 2002a, ch. 2).	1211099 424385.2
Klamath River Basin–Upper Sprague River	Unnamed Tributary of Dixon Creek	OR	Most recently confirmed presence of bull trout documented by Hartill and Jacobs (2007, p. 10).	This tributary to Dixon Creek is essential because it is currently occupied by bull trout and provides SR habitat for the resident local population.	1209312 425229